

of the upper surface of *Coletis* (or *Teracolus*) *amata* is well described as "orange." "Thaxter" on p. 405 is a misprint for Thayer. These, and a few similar slips, are but slight blemishes on a thoroughly useful book.

F. A. D.

THEORETICAL STUDIES IN RELATION TO NAUTICAL SURVEYING.

Hydrographic Surveying: Elementary—for Beginners: Seamen and Others. A Practical Handbook. By Commander Stuart V. S. C. Messum. Pp. xiv+504. (London: C. Griffin and Co., Ltd., 1910.) Price 12s. net.

THEORETICAL considerations dealing with the effect of errors of observation constitute one of the distinctive features of this book. It may be doubted whether such investigations are appropriate to a practical handbook intended for beginners; and in some instances, where they are merely of academic interest, their introduction is unnecessary. The dissertations on the manipulation of the station pointer, for example, are diffuse and of little practical utility. The chapter on the principles governing the selection of objects for fixing positions contains certain theorems which will be of interest to those already familiar with the subject; but beginners would find concise directions as to what goes to make a good fix more helpful to them. The discussions bearing on the "circle of equivalents" bring out a useful fact in a form somewhat different from that in which it has usually been presented. The principle involved is an important one, but it is possible to strain unduly its practical application. So much stress has been laid on it that beginners might easily be misled; the author himself appears to have misapplied the principle on more than one occasion.

This is notable in the example of plotting given on p. 197, where it is suggested to accept an intersection of two lines cutting each other at an angle of a little more than 30° , in preference to an intersection of about 90° . In this case primary points are alone concerned, and the considerations indicated by the author are not applicable. A similar misapprehension is noticeable on p. 201, in the paragraph relating to the projection of check lines from the best lines of reference. It is here implied that in the case of primary points, one of the lines on which they are plotted might have been laid off with a length of radius so short as to vitiate any lines laid off from it subsequently.

The question is discussed at some length as to the best zero to select for shooting up other objects when the position of the observer is not accurately determined. The problem is one of frequent occurrence, and is of great importance, but the treatment it receives is not satisfactory, and is liable to misapprehension. In this, as in some other cases, the broad practical rule of choosing a zero situated at about the same distance as the object to be shot up and making as small an angle with it as possible is not stated; whilst the investigation rests on assumptions not realisable when drifting in a boat or the ship in

an unknown direction, as always happens in practice. In the paragraph on measuring a base by chained portions, the rule of sines is used for solving triangles having one very obtuse angle and two acute angles. The proper method of solving such triangles might have suggested to the author the fact that since cosines of small angles change very slowly, small errors of observation are practically of no account, and consequently that the measurement of the off-set is unnecessary and less accurate than using each separate section of the base as measured.

Other instances of misapplication of theory to practice might be quoted, but those mentioned suffice to indicate a want of appreciation of practical requirements, and suggest the possibility that the author is more familiar with the theoretical study of the subject than with the conduct of a survey.

In discussing the question of false station, there is no reference to the simple method of eliminating all errors from that source by the expedient of observing at equal distances on opposite sides of the true station. There is, moreover, an easier method than that given by the author for calculating the correction for false station.

The use that might be made of a distant peak in connection with the angle of elevation of the mast-head when sounding a shoal has also escaped attention; neither is there any reference to the use of angles of elevation in making a running survey of an island when circumstances admit.

The investigation of the error of parallax in connection with sextant angles, due to the use of the long telescope when reflecting objects close to the observer, is of some theoretical interest, and is worthy of mention. As a matter of fact, the error from this source is not nearly so great as the author assumes, since it only exists in a minor degree with the short telescope which in practice is always used, being more convenient.

The various instruments and the methods of using them are fully described, and the ordinary operations connected with surveys of small extent are given in detail, together with a number of examples of such surveys, besides a useful chapter on amending the details of a chart.

A. M. F.

PRODUCTION OF SEED-OILS.

Linseed Oil and other Seed Oils: An Industrial Manual. By Prof. W. D. Ennis. Pp. xiv+316. (London: Constable and Co., Ltd., 1909.) Price 16s. net.

IN this work the author aims at the production of a manual which will serve as a fairly complete guide for the manufacturer of certain seed oils, more particularly linseed oil. He notes that, with one or two exceptions, the principal publications dealing with this subject hitherto have discussed it chiefly from the chemical standpoint. Accordingly in this volume the chemistry—which, after all, is relatively simple—is subordinated to the manufacturing and commercial aspects of the industry.

The work is written from the American point of

view, and this no doubt detracts somewhat from its value to the English manufacturer. On the other hand, the latter will probably find some compensation in seeing how his problems are regarded by other eyes.

After a short historical description, the first eight chapters deal with the standard forms of equipment used in extracting oil from seed by the pressure process. Such matters as the location and planning of the mill, the selection of the best type of apparatus, the handling of the seed, the treatment of the oil, and the moulding of the oil-cake are discussed in ample detail. Economical production is kept in view throughout.

In the second and some later chapters we come across pages of algebraical formulæ which at first sight look like extracts from a mathematical textbook. They are the author's method of analysing in general terms various problems of manufacture, in order to show definitely the effect of adopting certain processes or courses of treatment. For example, the question is discussed algebraically whether in given circumstances it pays best to separate the "screenings" from the seed and sell them, or to pass them through the mill with the seed, or, thirdly, to separate them and grind them up with "cake." When all the factors have been combined into a formula, the man with an eye for an equation can readily see what effect an alteration in any factor will tend to produce. The man not endowed with such an eye can readily puzzle the matter out, and be all the better for the exercise. In such a way an intelligent control over the operations can be maintained.

In the subsequent chapters the method of extracting oil from seeds by percolation with a volatile solvent is described and discussed. Only about 10 per cent., however, of the oil produced in the United States is obtained in this manner.

Questions of output, shrinkage, and cost of production are dealt with at some length; and there are chapters on refining, on boiled oil, and on miscellaneous seed oils. The author contrasts the great development of the cottonseed oil industry in the United States with the comparative neglect shown in regard to other oils—linseed excepted. Rapeseed oil is the most conspicuous failure; but more olive oil should be produced, he thinks, in California, more cocoa-nut oil on the Pacific coast, and more pea-nut oil in the eastern States.

A section on the chemical characteristics of linseed oil gives briefly the chief items which the oil-works chemist requires to know. Information on various technical points, collected from scattered trade journals, has also been included, and certain official rules and regulations, such as those of the New York Produce Exchange and the Minnesota Grain Commission, have been laid under contribution in respect of the commercial aspects of the industry.

Many illustrations of apparatus are given, and the treatment is throughout of eminently practical character. Probably there are few intelligent oil manufacturers who would not be able to get at least some useful hints from the book.

C. S.

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ZOOLOGY OF THE INDIAN OCEAN.

An Account of the Alcyonarians collected by the Royal Indian Marine Survey Ship "Investigator" in the Indian Ocean. By Prof. J. Arthur Thomson and J. J. Simpson. Part ii., The Alcyonarians of the Littoral Area. With a Report on the Species of *Dendronephthya* by Dr. W. D. Henderson. Pp. xviii+319+ix plates. (Calcutta: Indian Museum, 1909.)

THE first part of the memoir of the Alcyonarians of the Indian Ocean was published in 1906, and reviewed in NATURE of May 2, 1907. The second part deals with the shallow-water species, and fully maintains the high standard set by the first in wealth of detail and sumptuous illustration.

The authors of this volume have set themselves a task which is far more difficult than that of naming and describing the deep-sea species, and they have faced it boldly and, on the whole, satisfactorily. In the order Alcyonaria there are certain genera of wide distribution in tropical shallow waters which exhibit an infinite variety of form, of mode of branching, of colour, and of detail in skeletal characters, and the zoologist to whom the task is assigned of naming the spirit specimens sent to him by the collectors has to form an opinion as best he can on the vexed question of what characters or groups of characters in combination are sufficiently important to constitute a specific difference. In the absence of any knowledge of the development of the colonies, or of the relation of the different forms of growth to their surroundings on the reef, or of the transmission by heredity of the different characters he uses for purposes of classification, his opinion is rarely one of very great scientific value. Nevertheless, if his task is conscientiously performed, his descriptions accurate, and his illustrations adequate, our science is enriched by a number of recorded facts which may be of considerable value when the solution of the underlying biological problems is seriously taken in hand.

No better illustration of this difficulty could be found than that of the genus *Spongodes*, so excellently treated in this volume by Dr. W. D. Henderson. Following the example of Prof. Kükenthal, in whose laboratory he worked for some months, Dr. Henderson has distributed the specimens in the collection among no fewer than sixty-one species, of which fifty-three are described as new to science. But the question must occur to anyone who has seen *Spongodes* in abundance in its natural surroundings whether these numerous species could be maintained, even by the author himself, if another consignment of the same or greater dimensions were sent to him from the same locality. There is an advantage and a disadvantage in creating a large number of specific names for a common genus like *Spongodes*. It enlarges our knowledge by giving us detailed descriptions and illustrations, and in so far as it does that it is a gain; but, on the other hand, it tends to underestimate the importance of what may be a very definite character of all these common shallow-water genera, the power of adaptability to their immediate